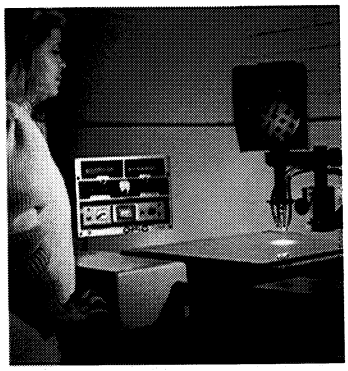

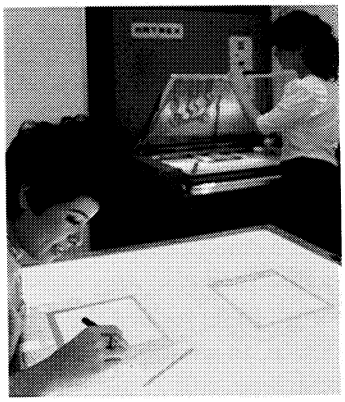

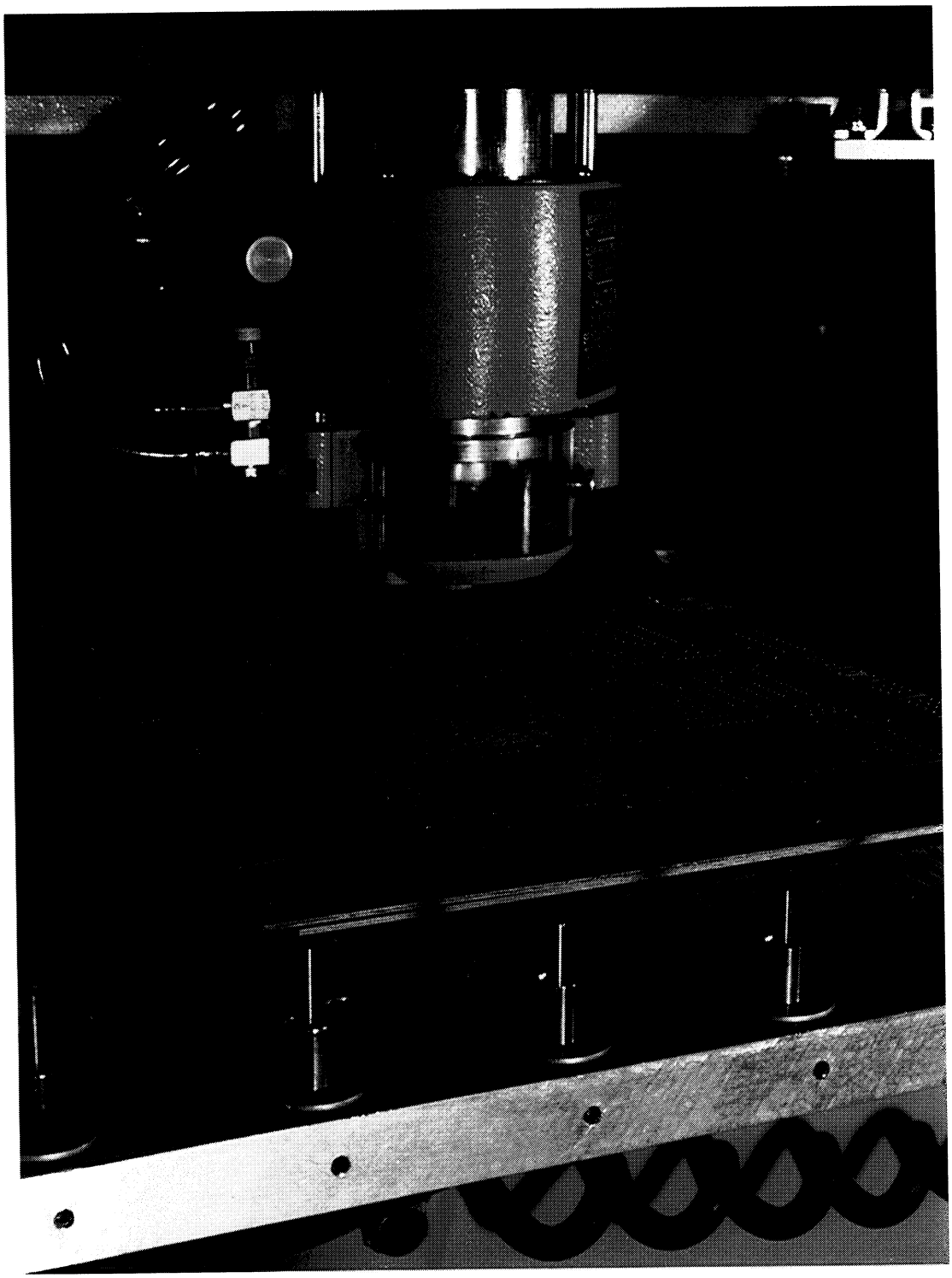

Young Electronics Company, Inc., North Hollywood, California is literally a young company, not yet three years old, but it is already a thriving business producing printed circuit boards. The product line ranges from one- and two-sided boards for computers and television sets to complex 21-layer boards for the on board computers of Air Force fighter aircraft. A new Young Electronics product is a training circuit board developed by NASA as a quality assurance aid.

The testboard was developed by Jet Propulsion Laboratory (JPL) as a tool for training and qualifying personnel in board assembly and in the art of soldering components—such as transistors, integrated circuits, resistors, capacitors and surface mount devices—without damaging boards or components. Looking for a company to manufacture the training boards in quantity, JPL selected Young Electronics. Working to NASA specifications, Young built and delivered 200 units to JPL.

Within a few weeks, Young was getting calls from electronics companies interested in purchasing training boards for their own operations. Young sought—and was granted—permission to use the NASA blueprints and tooling for commercial production and sale of training boards.

Young modified the original JPL design and went into production. The company has built a broad customer base for the training boards among principal electronic systems manufacturers, who buy them in substantial quantities and use them primarily as a means of pre-employment testing. Candidates are required to set up an electronic assembly and solder the components under stringent quality guidelines established by company or government specifications. The training boards are also used by some companies for periodic requalification of personnel as they are upgraded.

The accompanying photographs illustrate Young Electronics' manufacturing operations. At far left on the opposite page, an employee is using a target sight to program holes to be drilled in the circuit board; she aligns the holes on a template and assigns them coordinates on a computer tape that will later guide the drilling machines. In the lower left photo, two employees are image-transferring from film onto copper inner layers prior to drilling; they are working in a yellow fluorescent light environment as a "safelight" condition for exposing the film. In the large photo at left center, a high speed air bearing drill is working on a copper circuit board.

Young Electronics manufactures the boards without the components. The basic boards are designed to provide various levels of difficulty in assembling and soldering the components. Employment candidates or requalification personnel are tested for how fast and with what degree of quality they can complete the board. Upon completion, an inspector checks the soldering for quality (above); the testboard then becomes part of the individual's permanent record. ▲